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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	3602/100
Total Pages	
First Named Inventor or Application Identifier	Arthur S. Lynch, et al.
Express Mail Label No.	EJ619457641

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: Assistant Commissioner for Patents
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Washington, DC 20231

1. [X] Fee Transmittal Form
(Submit an original, and a duplicate for fee processing)

2. [X] Specification [Total Pages 14]
(preferred arrangement set forth below)
- Descriptive title of the Invention
- Cross References to Related Applications
- Statement Regarding Fed sponsored R & D
- Reference to Microfiche Appendix
- Background of the Invention
- Brief Summary of the Invention
- Brief Description of the Drawings (if filed)
- Detailed Description
- Claim(s)
- Abstract of the Disclosure

3. [X] Drawing(s) (35 USC 113) [Total Sheets 3]

4. Oath or Declaration [Total Pages 3]
a. [ ] Newly executed (original or copy)
b. [X] Copy from a prior application (37 CFR 1.63(d))
(for continuation/divisional with Box 17 completed)
[Note Box 5 below]
i. [ ] DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).

5. [X] Incorporation By Reference (useable if Box 4b is checked)
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.

6. [ ] Microfiche Computer Program (Appendix)

7. Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)
a. [ ] Computer Readable Copy
b. [ ] Paper Copy (identical to computer copy)
c. [ ] Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

8. [ ] Assignment Papers (cover sheet & document(s))
9. [ ] 37 CFR 3.73(b) Statement (when there is an assignee) [X] Power of Attorney
10. [ ] English Translation Document (if applicable)
11. [X] Information Disclosure Statement (IDS)/PTO-1449 [ ] Copies of IDS Citations
12. [X] Preliminary Amendment
13. [X] Return Receipt Postcard (MPEP 503)
(Should be specifically itemized)
14. [ ] Small Entity Statement(s) [ ] Statement filed in prior application, Status still proper and desired
15. [ ] Certified Copy of Priority Document(s)
(if foreign priority is claimed)
16. [ ] Other: "Express Mail" mailing label number EJ619457641
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Neal L. Rosenberg

17. If a CONTINUING APPLICATION, check appropriate box and supply the requisite information:
[X] Continuation [ ] Divisional [ ] Continuation-in-part (CIP)
of prior application No. 09/069,431

18. CORRESPONDENCE ADDRESS

[ ] Customer Number or Bar Code Label
(Insert Customer No. or Attach bar code label here)

(Signature of Corresponding Attorney)

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	:	Arthur S. Lynch et al.
Serial No.	:	Unknown
Filed	:	Herewith
For	:	GUIDEWIRE ADVANCEMENT SYSTEM

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Name: 9-29-99
Signature:

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination of the above-identified application, please amend the same as follows:

IN THE SPECIFICATION:

Page 1, line 3, after "is" add -- a continuation of Application No. 09/069,431 filed April 29, 1998, which is --.

Page 1, last line, after "engaged" add --with the guidewire, may be inserted into the--.

IN THE CLAIMS:

Cancel claims 2, 3, 4, 5, 7, 8, 9, 10, 11, 13, 14, 17, 19 and 22.

Amend the claims as follows:

Claim 6, line 1, delete "5" and add --1--; lines 1-2, delete "wherein the aperture is on the flexible tube and"; and line 3, delete "flexible tube" and add --casing--.

Claim 15, line 1, delete "11" and add --1--.

Claim 18, line 3, delete "flexible tube" and add --casing--.

Claim 20, line 1, delete "17" and add --16--; and line 3, delete "the" and add --a--.

Rewrite Claims 1 and 16 as follows:

1. [Amended] A guidewire advancement device comprising:

a flexible guidewire having a curved distal end;

a [flexible tube] casing for holding the guidewire, the [flexible tube] casing being formed in a loop and having [a port] an outlet;

[a housing having an opening for feeding the guidewire through, the housing being coupled to a distal end of the flexible tube, and the housing having a straightener thereon that includes] a [straightener tube] straightening element having a guidewire exit point and a tube portion adjacent the guidewire exit point, the tube portion formed [length and diameter] to straighten the curved distal end of the guidewire as the guidewire is passed through the [straightener tube] tube portion, the straightening element being connected to the casing at the guidewire exit point; and

an [access mechanism] aperture on said straightening element to expose a portion of the guidewire [positioned] and through which the portion of the guidewire can be

manually engaged, the aperture being located between the outlet of the casing and the tube portion of the straightening element.

16. [Amended] A guidewire advancement device [for a flexible guidewire having a curved distal end, the guidewire advancement device] comprising:

a flexible guidewire having a curved distal end;

a [flexible tube] casing for holding the guidewire, the casing being formed in a loop and having a portion extending beyond the loop, the portion extending to an end port;

[a housing having housing tube for receiving the guidewire, the guidewire extending through a first end of the housing and through the second end of the housing;]

an aperture in the casing to expose a [portion] length of the guidewire [positioned in the flexible tube] and through which the [portion] length of the guidewire can be manually engaged in order to displace the guidewire relative to the end port, the aperture positioned near the end port of the casing; and

a straightener that is connected to the [housing tube and] casing at the end port, which receives the guidewire displaced through the [housing] casing, the straightener including a straightener tube having a length and diameter to straighten the curved distal end of the guidewire.

Add Claims 23 as follows:

--23. The guidewire advancement device of Claim 16 wherein the portion of the casing extending from the loop extends tangentially from the loop.--

REMARKS

Claims 1, 6, 12, 15, 16, 18, 20, 21 and 23 are presented for examination. Claims 1 and 16 are in independent form and are believed to be patentable over the known prior art.

In addition to a copy of the parent application, Applicant submits a copy of the Declaration, a "Revocation of Prior Powers of Attorney and the Appointment of New Powers of Attorney" and an Information Disclosure Citation Statement, all from the parent application.

In view of the above amendments and remarks, a prompt examination of all claims is respectfully requested.

Respectfully submitted,

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Attorneys for Applicant
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By: _____
Neal L. Rosenberg
Registration No. 21,088

Dated: New York, New York
September 29, 1999

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TOH/RIB/asb
April 29, 1998

EJ619457641US

Date: 9/29/99 Express Mail Label No. EJ619457641

Inventor(s): Arthur S. Lynch and A. Walter MacEachern
Attorney's Docket No.: [illegible]

GUIDEWIRE ADVANCEMENT SYSTEM

RELATED APPLICATION(S)

This application is a continuation of Application No. 08/455,698 filed May 31, 1995, which is a continuation of Application No. 08/221,083 filed March 31, 1994, which is a continuation of Application No. 07/993,414 filed December 21, 1992, which is a continuation of Application No. 07/788,049 filed November 5, 1991 which is a continuation of U.S. Application No. 07/509,500 filed on April 13, 1990 which is a continuation-in-part of U.S. Application No. 07/372,047 filed on June 27, 1989, now U.S. Patent No. 4,917,094, which was a divisional application of U.S. Application No. 07/114,451 filed on October 28, 1987, now U.S. Patent No. 4,860,757, the entire contents of the above applications are incorporated herein by reference.

BACKGROUND OF THE INVENTION

The invention relates to devices for the insertion of catheter guidewires into blood vessels. A guidewire is inserted so that a catheter, which is coaxially engaged

blood vessel. The guidewire is then withdrawn, and the catheter is ready for further positioning and use. It is imperative that guidewires be inserted without contamination of the sterile field to avoid unnecessary infection of the patient.

Guidewires are generally comprised of a coiled spring guide with a distal tip and one or more wires running longitudinally within the spring. Such guidewire constructions are disclosed in U.S. Patents 4,003,369 and 4,676,249. Catheters are generally hollow, flexible tubes used to convey liquids or other instruments to a desired location in the body.

Existing systems for guidewire insertion suffer from continued problems arising from the lack of ease in manipulation and the exposure during insertion to a non-sterile environment. Normally, a guidewire is removed completely from its package prior to use, is wound in the physician's hand and inserted through a needle extending into the patient's artery, or through a cannula into some other body cavity. Three or more hands are required to hold the needle stationary while the "J" guidewire is pulled through a straightener, then pushed through the port in the needle. The inadvertent extension of the guidewire prior to insertion and the awkwardness of manipulation during insertion leads to contamination of the sterile field and the patient's blood stream. It is also desirable that the physician or operator be able to tactilely sense the progress of the guidewire tip during insertion to insure better control.

SUMMARY OF THE INVENTION

A catheter guidewire is packaged for use in a hollow tube or casing which maintains a sterile environment for the guidewire prior to use. The guidewire is displaceable

through an outlet at one or both ends of the tube for insertion into the desired artery or body cavity.

An aperture in the casing is located adjacent to the outlet so as to provide access to the guidewire surface. By applying a lateral frictional force to the surface of the guidewire in the direction of the outlet, the guidewire can be displaced through the narrow tube and the outlet.

A second tube attached to the outlet and disposed to receive the guidewire as it exits the casing can be used to straighten a "J" guidewire prior to entering a canal through a needle or cannula. In a preferred embodiment of the invention, the aperture for frictionally displacing the guidewire can be located in the straightening tube. The invention thus provides a means for maintaining a sterile environment during storage and insertion of the guidewire. Only one hand is necessary to operate the dispensing mechanism while the desired sensitivity to guidewire placement in maintained.

In another preferred embodiment, a moveable member is positioned over the aperture to maintain a sterile environment for the guidewire while at the same time providing the frictional force to displace the guidewire. This moveable member can be hand actuated rollers or a slidable bar or any other suitable mechanical device that maintains the tactile sense of the operator with regard to directing the guidewire through the system. The member which can be manually depressed to frictionally engage the guidewire surface. The moveable member can also be placed in a housing used to hold the two ends of the casing.

One embodiment of the system provides for the transmission of an electrocardiographic signal through the guidewire to determine the position of the distal end of the guidewire that has been inserted into a body canal. The housing that holds the frictionally engaging member

referenced above is positioned about the aperture and used to transmit an internally generated electrical signal onto the conductive guidewire element.

The above, and other features of the invention, including various novel details of construction and combination of parts, will now be more particularly described with reference to the accompanying drawings and pointed out in the claims. It will be understood that the particular guidewire advancement system embodying the invention is shown by way of illustration only and not as a limitation of the invention. The principle features of this invention may be employed in varied embodiments without departing from the scope of the invention. For example, the device can be utilized in the catheterization of any body cavity or artery, or alternatively in any veterinary applications involving catheterization procedures.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objects, features and advantages of the invention will be apparent from the following more particular description of preferred embodiments of the invention, as illustrated in the accompanying drawings in which like reference characters refer to the same parts throughout the different views. The drawings are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the invention.

Fig. 1 illustrates a plan view of the guidewire system generally;

Fig. 2 schematically illustrates a close up view of the guidewire aperture operated by hand;

Fig. 3 illustrates a plan view of an alternative embodiment where the aperture is located in the guidewire straightener;

Fig. 4 illustrates a perspective view of a guidewire advancement system using a slidable bar;

Fig. 5 illustrates a perspective view of a guidewire advancement system using rollers; and

Fig. 6 is a magnified cross-sectional view illustrating the use of an external monitor that displays an internally generated electrical signal transmitted along the guidewire that is employed in determining the position of the guidewire.

DETAILED DESCRIPTION OF THE INVENTION

A preferred embodiment of the guidewire advancement system 10 is illustrated in Figure 1. A flexible hollow tube 11 can be disposed in the shape of a curve or loop(s) as depicted to facilitate ease of operation. A guidewire 12 of standard coiled spring design is slidably inserted into tube 11. The guidewire 12 can enter or exit tube 11 through either of the two open ends 17 and 18. The guidewire 12 is inserted into a vein or artery through a needle, or canal or cavity by a cannula 19.

One end of the guidewire 12 can be formed in the shape of a flexible "J" 13. The "J" 13 may be straightened by pulling the end of the guidewire bearing the "J" back into the straightening element 14. The straightener 14 has a narrow hollow tube to which the "J" must conform upon entry therein. The straightener 14 is attached to tube 11 by inserting a small diameter portion 20 of straightener 14 into the port 17. The outer diameter of portion 20 is chosen so that it fits snugly into the hollow tube 11 at 17. The purpose of the "J" 13 is to permit the guidewire operator to more precisely direct the insertion of the

guidewire to the precise arterial location desired. As the guidewire proceeds along the inside of an artery there are commonly two or more paths for it to follow. The operator, using the tension in the straightened "J" to return to its preferred shape, can direct the guidewire down the desired artery path. Simply by rotating the guidewire within the cannula 19, the "J" 13 will be redirected as desired.

Existing guidewire packages typically involve the complete removal of the guidewire from the tubing in which they are stored before use. This often exposes the guidewire to non-sterile environments thereby risking the infection of the patient when the exposed guidewire is inserted into the bloodstream.

The present invention claims the use of apertures 15 and 16 located adjacent the two end ports 17 and 18. These apertures provide access to the guidewires 12 so that it may be inserted into the bloodstream without being first removed from its storage tube 11 or jacket. The apertures 15 and 16 permit the use of the guidewire to be confined within the sterile field thereby substantially reducing the risk of unnecessary infection.

Figure 2 illustrates how the apertured guidewire system may be operated by hand. By inserting his or her thumb into the aperture 16, the operator frictionally engages the guidewire 12, and can either advance or retract it as shown. This design permits one handed operation that is sensitive to guidewire placement. Aperture 16 may be used, as opposed to aperture 15 in figure 1, where the operator prefers to use the straight end 21 of the guidewire through port 18, instead of the "J" shaped end 13.

Figure 3 illustrates another preferred embodiment of the invention where the straightener 14 is provided with aperture 25. The guidewire 12 can be manipulated through

aperture 25 directly adjacent the guidewire exit point 22, instead of further back along the tube 11 at aperture 15 in Figure 1.

To further isolate the guidewire from exposure to non-sterile environments the apertures 15 and 16 can be enclosed with an element 30 as illustrated in Figures 4 and 5. The element 30 is used to hold the two ends of the tube 11 in the shape of a loop as shown in Figure 1. The two ends of tube 11 are both snapped into the two parallel partially open tubes 33 extending through element 30 such that the apertures 15 and 16 (not shown) are completely enclosed.

A rectangular opening 31 can be made in the element 30 opposite the apertures (not shown) in tube 11. A slidable cam or bar 32 may be fitted into opening 31 that can be manually depressed to frictionally engage the guidewire. By positioning the cam 32 at one end of the opening 31, the guidewire 12 may be advanced through the tube 11 in one direction. By depressing the cam 32 to engage the guidewire, the operator slides the cam 32 to the other end of the opening 31, releasing the cam 32 from its depressed position, moving the cam 32 back to its position at the opposite end of the opening 31, and then repeating this sequence of steps until the guidewire is in the desired location.

Figure 5 illustrates a further embodiment of the invention in which a number of rollers 35 may be depressed to engage the guidewire 12 through an enclosed aperture in tube 11. These rollers frictionally engage the guidewire 12 such that their manually actuated rotation causes the guidewire to be pushed through tube 31 for insertion into the artery.

Both the cam 32 of Figure 4 and the rollers 35 of Figure 5 may be held within member 30 by resilient means

which lift the cam 32 or rollers 35 off of the guidewire 12 when not manually depressed against it by the operator. This resilient means renders the cam 32 or rollers 35 easier to cycle a number of times to fully extend the guidewire.

Another preferred embodiment is illustrated in the magnified cross sectional view of Figure 6. As in Figure 4, a conductive guidewire 12 is displaceable through tubing 11, that is held by a housing 30. A slideable bar 32 is configured to move back and forth within an opening 31. The bar 32 is supported by a track 43. A lower portion of the track 43 incorporates a conductive lining 44 in conductive contact with a conductive pad 40 mounted on the underside of bar 32. The track 43 and attached lining 44 are flexible thereby permitting the bar 32 to be depressed manually by the operator such that the pad 40 comes in contact with the guidewire through aperture 15 of tube 11. The lining 44 is in conductive contact with an outlet 42 by wire 41. The outlet 42 is mated with an external plug 45 connected to a monitoring circuit 38 including a diode 39 and an external monitor 46. The diode 39 prevents any back current from being transmitted from circuit 38 into the guidewire which can be harmful to the patent. The electrical signal generated by an internal organ such as the human heart transmits a signal through the guidewire 12 to pad 40 when the bar 32 is depressed. This signal is transmitted through the distal tip of the guidewire that has been inserted into a bodily canal or artery to determine the location of the distal tip within the body being catheterized. As the tip approaches the heart muscle, it transmits the electrical current generated about the heart along the guidewire through the engaging means of the housing to be displayed by the monitor 46. This system provides for a more precise positioning of the

guidewire as well as the catheter while at the same time providing for the sterile insertion of the guidewire.

EQUIVALENTS

While this invention has been particularly shown and described with references to preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention as defined by the appended claims. Those skilled in the art will recognize or be able to ascertain using no more than routine experimentation, many equivalents to the specific embodiments of the invention described specifically herein. Such equivalents are intended to be encompassed in the scope of the claims.

CLAIMS

What is claimed is:

1. 1. A guidewire advancement device comprising:

a flexible guidewire having a curved distal end;

a flexible tube for holding the guidewire, the flexible tube having a port;

a housing having an opening for feeding the guidewire through, the housing being coupled to a distal end of the flexible tube, and the housing having a straightener thereon that includes a straightener tube having a length and diameter to straighten the curved distal end of the guidewire as the guidewire is passed through the straightener tube; and

an access mechanism to expose a portion of the guidewire positioned and through which the portion of the guidewire can be manually engaged.

2. The guidewire advancement device of claim 1 wherein the access mechanism is an aperture on the flexible tube.

3. The guidewire advancement device of claim 1 wherein the access mechanism is an aperture on the housing.

4. The guidewire advancement device of claim 1 further comprising a frictionally engaging element for selectively frictionally engaging the guidewire.

5. The guidewire advancement device of claim 4 wherein the access mechanism is an aperture and the frictionally engaging element overlies the aperture.

6. The guidewire advancement device of claim 5 wherein the aperture is on the flexible tube and further comprising a second aperture on the flexible tube.

7. The guidewire advancement device of claim 1 wherein the access mechanism is an aperture and further comprising a frictionally engaging element for selectively frictionally engaging the guidewire.

8. The guidewire advancement device of claim 7 wherein the frictionally engaging element for selectively frictionally engaging the guidewire has a plurality of rollers.

9. The guidewire advancement device of claim 1 wherein the aperture is on the flexible tube.

10. The guidewire advancement device of claim 7 wherein the frictionally engaging element for selectively frictionally engaging the guidewire has a slideable bar.

11. The guidewire advancement device of claim 10 wherein the aperture is on the flexible tube.

12. The guidewire advancement device of claim 1 further comprising a retaining element for retaining the flexible tube in the shape of a loop.

13. The guidewire advancement device of claim 12 wherein the access mechanism is an aperture on the flexible tube and further comprising a frictionally engaging element having a plurality of roller for selectively frictionally engaging the guidewire.

14. The guidewire advancement device of claim 12 wherein the access mechanism is an aperture on the flexible tube and further comprising a frictionally engaging element having a slideable bar for selectively frictionally engaging the guidewire.

15. The guidewire advancement device of claim 11 further comprising a cannula that receives the guidewire from the straightener.

16. A guidewire advancement device for a flexible guidewire having a curved distal end, the guidewire advancement device comprising:

a flexible tube for containing the guidewire;

a housing having a housing tube for receiving the guidewire, the guidewire extending through a first end of the housing and through a second end of the housing;

an aperture to expose a portion of the guidewire positioned in the flexible tube and through which the portion of the guidewire can be manually engaged; and

a straightener that is connected to the housing tube and receives the guidewire displaced through the housing, the straightener including a straightener tube having a length and diameter to straighten the curved distal end of the guidewire.

17. The guidewire advancement device of claim 16 wherein the housing having a second housing tube for receiving a second portion of the guidewire.

18. The guidewire advancement device of claim 16 further comprising a second aperture to expose a portion of the guidewire positioned in the flexible tube and

through which the portion of the guidewire can be manually engaged.

19. The guidewire advancement device of claim 18 wherein the housing further comprises a second housing tube for receiving a second portion of the guidewire and the housing overlies both the first and second aperture of the flexible tube.

20. The guidewire advancement device of claim 17 wherein the flexible tube is retained in the shape of a loop by the housing.

21. The guidewire advancement device of claim 20 further comprising a cannula that receives the guidewire from the straightener.

22. The guidewire advancement device of claim 21 wherein the guidewire can be manually engaged through the aperture without an intervening mechanical element.

GUIDEWIRE ADVANCEMENT SYSTEM

ABSTRACT OF THE DISCLOSURE

A guidewire advancement system for inserting catheter guidewires into blood vessels, and more particularly a guidewire dispensing system for the controlled sterile insertion of a coiled spring guidewire to avoid infection of the patient. The system provides for the transmission of an electrical signal by the guidewire to determine its location within the body.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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11-10-98

Signature

Neal L. Rosenberg reg # 21,088

In re Application of	:	Arthur S. Lynch and A. Walter MacEachern
Serial No.	:	09/069,431
Filed	:	April 29, 1998
For	:	GUIDEWIRE ADVANCEMENT SYSTEM
Examiner	:	R. Shay
Group Art Unit	:	3738

REVOCATION OF PRIOR POWERS OF ATTORNEY
AND
APPOINTMENT OF NEW POWERS OF ATTORNEY

To the Commissioner of Patents and Trademarks:

The undersigned inventors of the above-identified application for letters patent hereby revoke all prior Powers of Attorney and appoint the following attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: Morton Amster, Reg. No. 16,677; Jesse Rothstein, Reg. No. 20,118; Daniel S. Ebenstein, Reg. No. 24,932; Philip H. Gottfried, Reg. No. 25,871; Michael J. Berger, Reg. No. 25,829; Neil M. Zipkin, Reg. No. 27,476; Anthony F. LoCicero, Reg. No. 29,403; Joel E. Lutzker, Reg. No. 29,406; Kenneth P. George, Reg. No. 30,259; and Neal L. Rosenberg, Reg. No. 21,088, all members of the Bar of the State of New York and the United States Patent and Trademark Office,

provided that if any one of said attorneys ceases being affiliated with the law firm of Amster, Rothstein & Ebenstein as partner, employee or of counsel, such attorney's appointment as attorney and all powers derived therefrom shall terminate on the date such attorney ceases being so affiliated.

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Dated: November 2, 1998

Arthur S. Lynch

Dated: November 2, 1998

A. Walter MacEachern

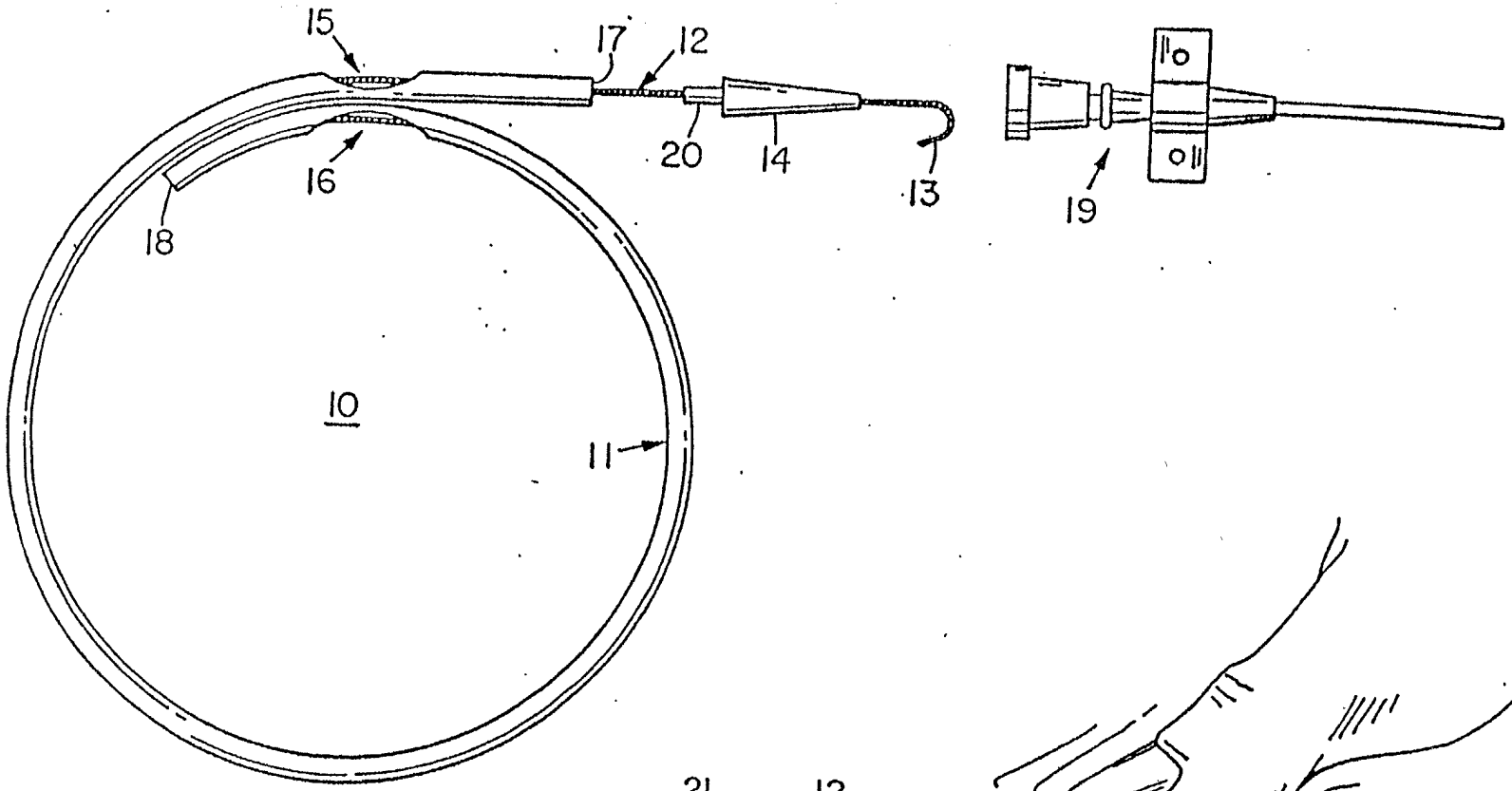

Fig. 1

Fig. 2

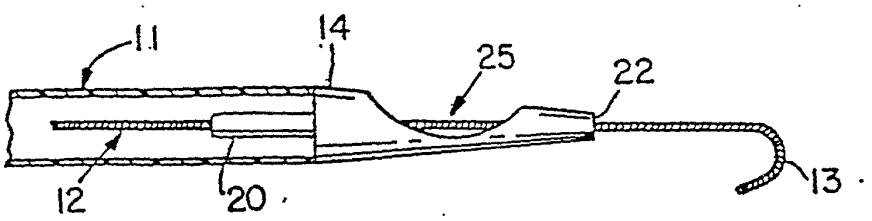

Fig. 3

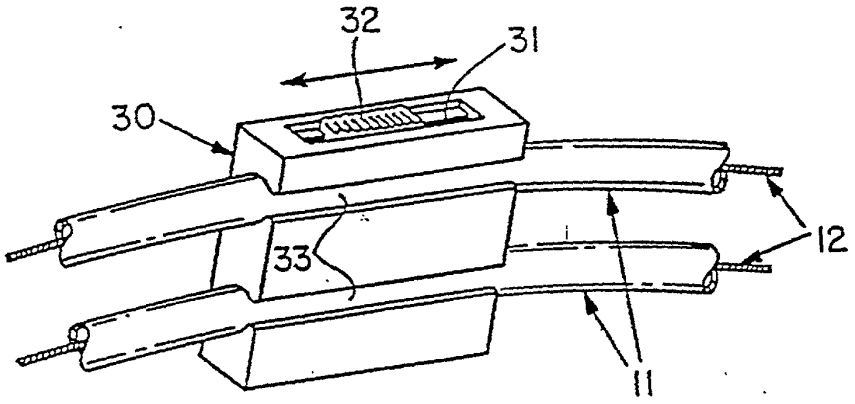

Fig. 4

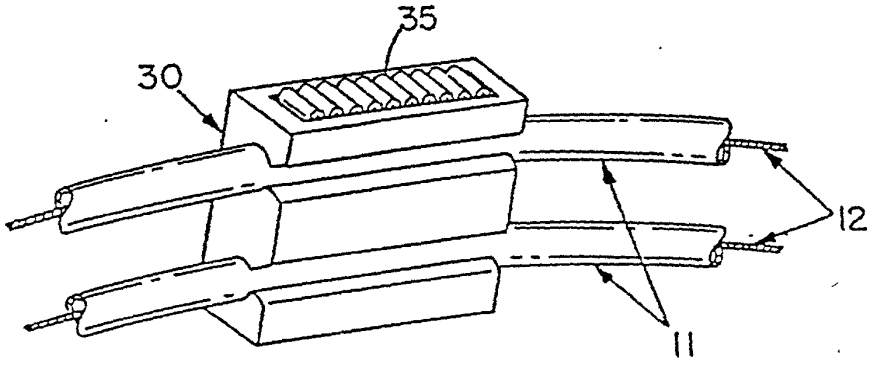

Fig. 5

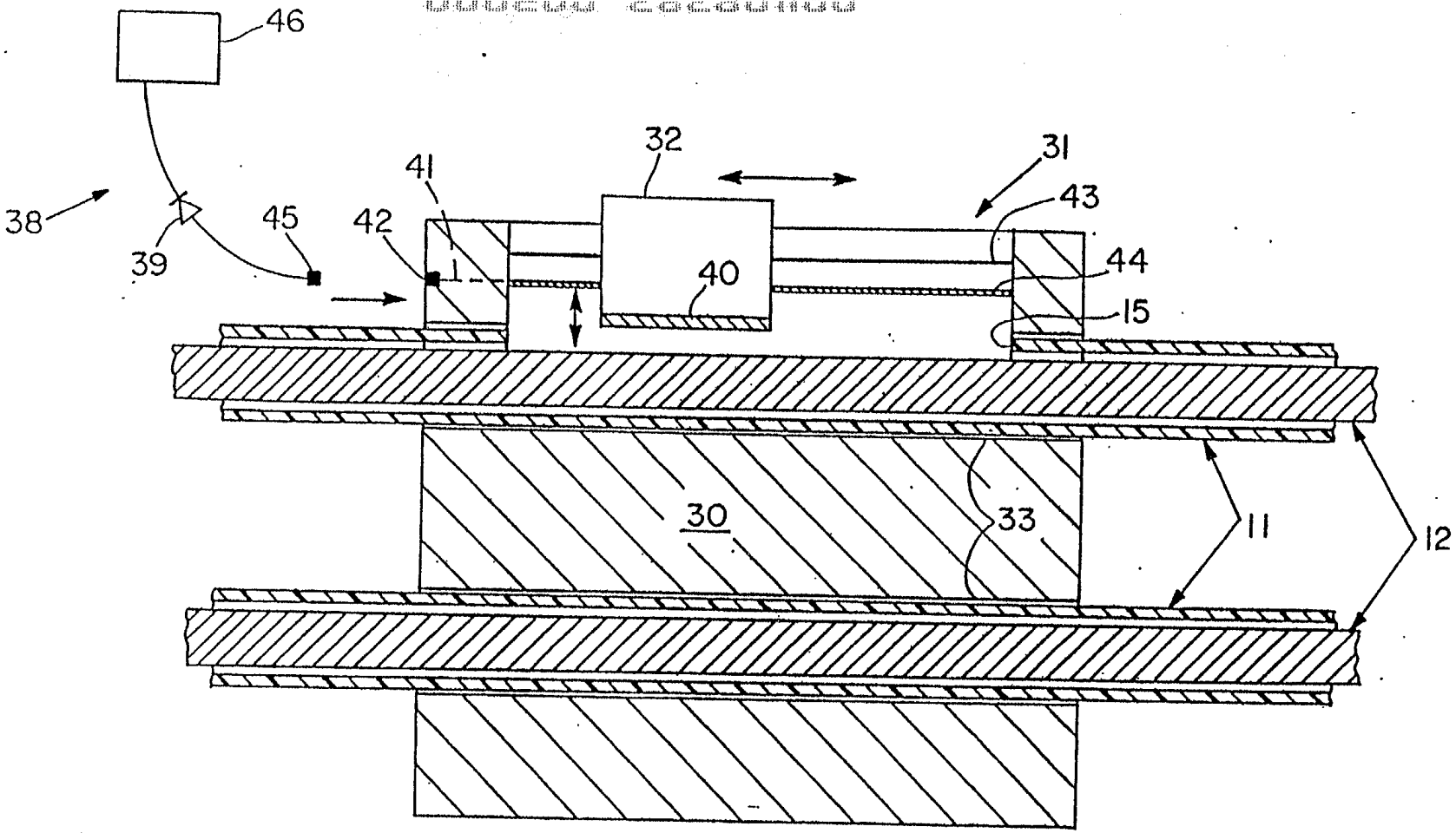

Fig. 6

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Declaration for Patent Application

As a named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated next to my name;

I believe I am the original, first and sole inventor (if only one name is listed) or an original, first and joint inventor (if plural names are listed in the signatory page(s) commencing at page 3 hereof) of the subject matter which is claimed and for which a patent is sought on the invention entitled

GUIDEWIRE ADVANCEMENT SYSTEM

the specification of which (check one)

/X/ is attached hereto.

/__/ was filed on _____ as Application Serial No._____ (if applicable). and was amended on _____

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

(Number)	(Country)	(Day/Month/Year filed)	Priority Claimed
			/__/ Yes /__/ No
			/__/ Yes /__/ No
			/__/ Yes /__/ No

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

07/509,500	April 13, 1990	Pending
(Application Serial No.)	(Filing date)	(Status, patented, pending, abandoned)
07/372,047	June 27, 1989	Patented
(Application Serial No.)	(Filing date)	(Status, patented, pending, abandoned)
07/114,451	October 28, 1987	Patented

As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

I also hereby grant additional Powers of Attorney to the following attorney(s) and/or agent(s) to file and prosecute an international application under the Patent Cooperation Treaty based upon the above-identified application, including a power to meet all designated office requirements for designated states.

David E. Brook	Registration No. 22,592
James M. Smith	Registration No. 28,043
Leo R. Reynolds	Registration No. 20,884
Richard A. Wise	Registration No. 18,041
Patricia Granahan	Registration No. 32,227
Mary Lou Wakimura	Registration No. 31,804
Thomas O. Hoover	Registration No. 32,470
Alice O. Carroll	Registration No. 33,542
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Richard W. Wagner	Registration No. 34,480
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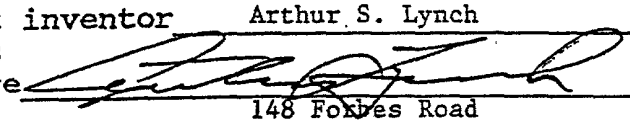
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor: Arthur S. Lynch

Inventor's Signature:  Date: 10/29/91

Residence: 148 Forbes Road
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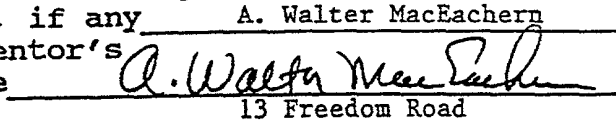
Full name of second joint inventor, if any: A. Walter MacEachern

Second Inventor's Signature:  Date: 10/25/91

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Full name of third joint inventor, if any: _____

Third Inventor's Signature: _____ Date: _____

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Full name of fourth joint inventor, if any: _____

Fourth Inventor's Signature: _____ Date: _____

Residence: _____

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